CHELSEA CREEK COMMUNITY BASED COMPARATIVE RISK ASSESSMENT
CHAPTER 5: TRAFFIC

1. Overview of Traffic in the Chelsea Creek Community

Traffic is a concern to every community. Traffic poses risks of injury to pedestrians and children playing near the street and plays an integral role in the public and environmental health of a community. Both Chelsea and East Boston are densely populated communities located adjacent to several major roadways serving the City of Boston, including Routes 1, 1A and 16. Chelsea and East Boston are also home and adjacent to many industries that use trucks to transport their goods. As a result, there are a large number of trucks that pass through these communities on a daily basis.

There are many public and environmental health concerns related to traffic. Vehicle exhaust, fumes from gas stations and fuel storage, tire dust, and evaporating paints from auto body shops contribute to air pollution, affecting human health[1] (for more on Air Quality and Noise, see Chapters 2 and 6). The water quality of local rivers like the Chelsea Creek is also affected by transportation. Cars and other vehicles release metals such as cadmium, chromium, copper, lead, and mercury as a result of tire and brake wear, as well as through the exhaust pipe. These metals settle on the ground and are washed by rain into rivers. Water also becomes polluted as a result of improper disposal of motor oil. In addition, it is estimated that 250 million gallons of oil leak from motor vehicles each year. Oil and road salt that are deposited on roadways also wash into water bodies such as the Creek. In addition to the air and water quality issues surrounding transportation, heavy traffic has been found to lower property values, undermine the cohesiveness of a community, increase crime, and cause noise pollution.

Even though there are many environmental and public health problems associated with traffic, there is no one agency that regulates traffic and its effects. The Federal EPA establishes water and air quality standards that relate to traffic such as the Non-point Source Management Program and vehicle emission standards, and the Massachusetts Department of Environmental Protection (DEP) implements these regulations. Roadways are also regulated by more than one governmental body. Jurisdiction of roadways fall under Federal, State, or local regulations, and under policies of independent authorities. Some of the highways are controlled by the Massachusetts Highway Department (MHD), and others by the Massachusetts Turnpike Authority (MTA) and the Metropolitan District Commission (MDC). Local governments also have the power to impose truck exclusions under Chapter 85 of the Massachusetts General Laws. Given this complexity of oversight, it can be difficult for a community to get information on the regulatory process to change traffic patterns and use of a particular roadway.

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[1] *City Routes, City Rights: Building Livable Neighborhoods and Environmental Justice by Fixing Transportation*. Conservation Law Foundation. June 1998, page 13.

2. Review of Existing Chelsea and East Boston Traffic Information

There is little data on traffic within the communities of Chelsea and East Boston, and the research that exists has been conducted as part of a more comprehensive study of the greater metropolitan area. Much of the research has focused on trucks most likely due to the size and weight of trucks and the potential for trucks to impact road conditions and air quality. Many of the residents surveyed as part of the Comparative Risk Assessment specifically mentioned trucks as a traffic concern. Specific available data, gathered by the Central Transportation Planning Staff (CTPS), includes the following:[2]

- 775 trucks use the Carter Street exit (Chelsea) off of Route 1 daily
- 67 of these trucks are classified "hazardous," 8.6% of the total number of trucks exiting on a daily basis
- The Tobin Bridge carries over 5,000 trucks daily

In addition to the data above, research has been done by the CTPS on the number of daily truck trips within Chelsea and East Boston. The data is not broken down into types of trucks, nor is truck density within these communities addressed.

Average daily vehicle counts are also available for specific intersections and roadways. The Massachusetts Highway Department publishes Massachusetts Traffic Volume Counts each year for different intersections. The data from Chelsea and East Boston is listed below in Table 15.

Community members have also done some traffic counts along major truck routes. The Chelsea Green Space and Recreation Committee Youth Environmental Crew counted cars, diesel trucks, buses, and other vehicles at the heavily trafficked intersection of Marginal Street and Williams Street. The study covered two two-hour periods during the work day; an average of 3400 vehicles, 285 of which were trucks, entered the intersection during each 2 hours period.

While all traffic is a priority issue to residents, truck traffic in residential areas is of particular concern. Chapter 85 of the Massachusetts General Laws grants municipalities in Massachusetts the power to exclude trucks from a section of roadways. All truck exclusions within Massachusetts must include the following characteristics:

- The excluded roadway must be owned by the municipality
- The size of the truck to be excluded must be specified, usually greater then 2.5 tons carrying capacity
- The time period during which the exclusion is in force is specified
- Only through traffic is excluded; local access is allowed
- MHD must grant a permit before any "No Trucks" signs are posted

[2]Ibid, 40

Table 15 Average Daily Traffic Counts for Chelsea and East Boston						
	1995	1996	1997	1998	1999	2000
Chelsea						
Beacon Street Under Route 1	1100			1500		
Eastern Ave., North of Griffin Way			17500			
East Boston						
Chelsea St. Bridge			21800			
Meridian Street Bridge			24900			
Route 1A at Ramp to Logan Airport			31600			
Route 1A, Callahan Tunnel Outbound	49567	36494				
Route 1A, Sumner Tunnel Inbound	47093	44414	41518	37392		35119
Saratoga Street, West of Boardman Street		7500			8100	

Massachusetts Highway Department, Massachusetts Traffic Counts

All truck exclusions must be approved by the MHD. A municipality interested in changing the status of a roadway to exclude trucks, must submit a proposal to the MHD. The proposal must include significant analysis supporting its application and show that "a suitable alternate route is available."[3] There are a number of truck exclusions in place within both Chelsea and East Boston. These exclusions are outlined in Table 16. All truck exclusions listed are in effect 24 hours a day.

3. Analysis of Existing Traffic Data

The data that are available for Chelsea and East Boston do not fully portray the impacts on air quality, noise, and road congestion that traffic imposes on the community. Traffic counts do not reflect the impact of air quality of vehicles idling in traffic jams or along curbs. Road congestion increases the number of vehicles standing idling. Idling by trucks, buses, and cars as they wait to load or unload passengers or cargo also represents a source of air pollutants. Unless a vehicle requires engine power to be maintained, idling for more than five minutes is against

[3]Ibid, 26

Massachusetts state law (Massachusetts General Law Chapter 90, Section 16A). Data on the prevalence of idling vehicles is not available.

Table 16 Truck Exclusions in Chelsea and East Boston

Municipality	Permit Number	Exclusion Street Name	From	To	Alternate Route
Chelsea	E-B-057-6040	Broadway	Crescent Ave.	Eastern Ave.	Truck route established by city
	E-B-057-6040	Broadway	Gerrish Ave.	Williams St.	Truck route established by city
	E-B-057-6040	Chestnut St.	Williams St.	Everett Ave.	Truck route established by city
	E-B-057-6040	Cross St.	Broadway	Park St.	Truck route established by city
	E-B-057-6040	Everett Ave.	Tobin Bridge On-Ramp	Broadway	Truck route established by city
	E-B-057-6040	Library St.	Highland St.	Broadway	Truck route established by city
	E-B-057-6040	Nichols St.	Eustis St.	Everett city line	Truck route established by city
	E-B-057-6040	Park St.	Williams St.	Central Ave.	Truck route established by city
	E-B-057-6040	Pearl St.	Williams St.	Park St.	Truck route established by city
	E-B-057-6040	Second St.	Arlington St. Extension at NE X-Way	Park St.	Truck route established by city
	E-B-057-6040	Spencer Ave.	Cary Ave.	Eastern Ave.	Truck route established by city
	E-B-057-6040	Stockton St.	Eastern Ave.	Parkway Plaza	Truck route established by city
	E-B-057-6040	Webster Ave.	Tobin Bridge Off-Ramp	Eastern Ave.	Truck route established by city
	E-B-058-7019 A	Tremont St.	Medford St.	Williams St.	Broadway, Williams St., Winnisimmet St.
	E-B-058-7019 A	Medford St.	Broadway	Tremont St.	Broadway, Williams St., Winnisimmet St.
	E-B-058-7019 A	Beacon St.	Broadway	Winnisimmet St.	Broadway, Williams St., Winnisimmet St.
	E-B-058-7019 B	Beacon St.	Broadway	Chestnut St.	Broadway, Williams St., Chestnut St.
East Boston	13129	Maverick St.	Chelsea St.	Airport Rd.	

While a survey of road signs revealed that most of the truck exclusion routes are marked with

a sign indicating limits on vehicle size, exclusions may not be strictly enforced. Compliance with local truck exclusions is the jurisdiction of the City Police. In addition, the establishment of truck exclusions concentrates truck traffic on other streets. A comprehensive truck route evaluation should be conducted in order to determine if truck patterns should be further altered.

Although truck traffic has particular impacts on the communities of Chelsea and East Boston, non-truck traffic affects the community as well. Chelsea has one of the highest car insurance rates in the state of Massachusetts. The number of traffic accidents in the community has been cited as a reason for this. However, there has not been a study to determine how many of the accidents involve drivers from outside of Chelsea. A survey of police accident reports would serve to determine the percent of accidents that involve residents. Further, a traffic study would serve to determine the percentage of truck and non-truck traffic within Chelsea and East Boston.

Chelsea is located just a few miles from the city of Boston, yet the commute for some residents can take as long as 2 hour, and can involve two or three transfers.[4] This is due to a lack of comprehensive public transportation. In 1995, the cities of Boston, Chelsea, Everett, Somerville, Cambridge, and Brookline signed a compact in which each of these cities "commit to identify economic development, social services, retail, educational, residential and parkland projects to be integrated with the MBTA's circumferential transit project and to incorporate both the transit elements and other projects into each municipalities' General Plan."[5] The Circumferential Ring Regional Planning Compact hinges on the development of a 14 mile circular transit corridor which would connect the "spokes of Boston's downtown-centered transit system." Although the proposed Urban Ring would carry as many passengers as the orange and red lines, there has not been any move to begin this project.

4. Potential Concerns for Public Health and the Environment

Air Quality

Vehicles emit a number of pollutants which negatively impact public health. Table 17 lists some of the pollutants emitted by vehicles, and the potential health implications of these pollutants.

[4]Conservation Law Foundation: *Where is the Urban Ring*? http://clf.org/advocay/urban1.htm
[5]Ibid

Table 17 - Potential Health Implications of Vehicle Emissions	
Pollutant	**Potential Health Implication**
Hydrocarbons	React with nitrogen oxides and sunlight to form ground-level ozone. Ozone irritates the eyes, damages the lungs and aggravates respiratory problems. A number of exhaust hydrocarbons are toxic, and have the potential to cause cancer.
Particulate Matter (PM2.5)	Very small particles can be inhaled into the lower respiratory system. PM2.5 can cause asthma and other respiratory problems. PM2.5 has also been linked to heart attacks and lung cancer.
Carbon Monoxide	Reduces the flow of oxygen to the bloodstream. In urban areas where carbon monoxide is more concentrated, the central nervous system and heart are affected. Symptoms include headache, fatigue, and dizziness.
Carbon Dioxide	Does not directly impair human health, but it is a greenhouse gas and thus contributes to the potential for global warming

A link has been established between pollutants produced by traffic and increased asthma incidence. Researchers have found that as levels of certain air pollutants increase, the number of asthma-related hospital admissions also rises. For example, a study in Birmingham UK showed that children with diagnosed asthma were more likely to live within 500 meters of a main road than children admitted for non-respiratory reasons, or children chosen at random from the community. This conclusion is further demonstrated by a study of paved road dust conducted by members of the Environmental Engineering Science Department of the California Institute of Technology. In the study more than 30 different biologic source materials were found in paved road dust. Among the materials identified were: pollen, pollen fragments, animal dander, mold, exhaust particulates, tire dust, brake lining wear dust, and plant fragments. These materials are known to exacerbate allergenic disease in humans. Most significantly, the study found that when paved road dust is re-suspended into the atmosphere by passing vehicle traffic, allergen concentrations in the air are increased above the levels that would occur without the vehicle traffic.[6]

A study of childhood asthma attacks during the 1996 Summer Olympics in Atlanta supported these findings. During the Olympic Games, traffic count dropped considerably because of efforts to discourage residents from driving into the city. The reduction in traffic corresponded to improved air quality and a 42 percent reduction in medical visits for asthma attacks (Friedman, et al., 2001).

In addition to triggering asthma attacks, air pollutants such as ozone may also cause asthma in exercising children (McConnell, et al., 2002). This is of particular concern since many of the parks in Chelsea and East Boston are located close to major roadways (see Chapters 3 and 4).

[6]Miguel, Ann et. al. "Allergens in Paved Road Dust and Airborne Particles." *Environmental Science Technology*. 33 (23), 4159-4168, 1999

An analysis of nationwide emissions has shown that vehicular emissions account for more than 50 percent of all hazardous air pollutants (HAPs) released to the atmosphere. The impact of traffic on air quality is directly linked to the number of vehicle miles driven, and therefore, community planning and development to encourage other modes of transportation should be implemented to reduce traffic and vehicular emissions. For more information on the links between traffic, air quality, and asthma, see Chapters 2 and 4.

Noise

Residents of Chelsea and East Boston have expressed concern over noise and vibrations generated by traffic, specifically truck traffic, through their communities. Parameters that contribute to traffic noise and vibrations include: pavement surface roughness, vehicle weight, vehicle speed, and the vehicle suspension system.[7] Another source of noise related to traffic is Jake brakes. Jake brakes are engine compression brakes that are used by truckers on steep grades and when a trucker wishes to save wear and tear on a truck's normal brakes. It is possible to ban the use of Jake brakes if it can be shown that they are not necessary in the specified area.[8] More information on noise is included in Chapter 6.

Diesel Exhaust

Although diesel engines use less fuel per mile traveled than gasoline engines, diesel burning vehicles produce some of the emissions with the highest impact on health. Diesel produces a large quantity of nitrogen oxides (NO_x) which contributes to the formation of ozone (O_3) smog. Diesel also produces particulate matter (PM 2.5) consisting of small particles (less than 2.5 microns in diameter). These particles are the most harmful type of particulate matter because they can be inhaled more deeply into the respiratory system.[9] Diesel is used extensively by trucks, buses, construction equipment, and by some trains.

Small particulate matter produced by diesel combustion has been linked to heart attacks and asthma, and there is increasing evidence that diesel exhaust or diesel particulate matter may cause lung cancer in humans. Non-cancerous effects such as lung damage and respiratory problems are also associated with exposure to diesel exhaust.[10]

Traffic Injuries

Over recent years there have been several accidents involving trucks exiting too quickly off the Tobin Bridge and crashing into the homes of Chelsea residents. In June of 2000, a truck careened off the Tobin Bridge and crushed a car on Chestnut Street. The woman driving the car was killed. In May, 2001, a truck exiting from Route 1 beyond the Tobin Bridge lost control and crashed into a home, injuring three residents. These incidents have highlighted the concerns of the residents about traffic safety and trucks in residential neighborhoods.

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[7]Ibid, 88
[8]Ibid
[9]*City Routes, City Rights: Building Livable Neighborhoods and Environmental Justice by Fixing Transportation.* Conservation Law Foundation. June 1998, page 56
[10]Ibid

5. GIS Maps of Available Traffic Data and Information

Note: There is a map associated with this chapter - download the map entitled" Road Ownership

The attached map shows the primary routes through and around Chelsea and East Boston. The roads shown in green are part of the National Highway System (NHS), meaning that federal funds may be used for road maintenance. Some of these routes are owned by the state, others are locally owned but have a state route number, and others are owned by the MDC. Routes within the NHS generally cannot have truck exclusions, and parkways with existing truck exclusions (such as Storrow Drive) which were included in the NHS had to have alternative truck routes designated.

The map also shows local roads through Chelsea and East Boston where truck exclusions are already in place. As shown in pink, there are numerous exclusions in Chelsea, which concentrates truck traffic on Marginal Street.

There is not enough traffic count data to produce a map showing the areas that might be impacted most by traffic, but the map produced for noise impacts (See Chapter 6) shows the locations of industrial and commercial enterprises which might contribute to heavy traffic flow. Residential areas which are likely to be the most impacted by noise and traffic are also shown on this map.

6. Current Traffic Projects or Activities in Chelsea and East Boston

Chelsea and East Boston residents have long worked to improve traffic conditions in the community as they relate to traffic injuries, air quality, traffic congestion, and parking. The Chelsea Green Space and Recreation Committee conducted traffic surveys over a two-day period at the Marginal Street and Williams Street intersection, and individual residents have done traffic counts near their homes to assess the impact of trucks and other vehicles. A broader effort to study traffic in the Chelsea Creek community could be built on these efforts.

Chelsea residents have been working on two traffic related projects: closing and rerouting of trucks from the Beacon Street off-ramp and the implementation of resident-only parking restrictions near the court house. The Beacon Street off-ramp is now closed to all trucks over eight tons. Signs and other means of diverting trucks have been installed.

7. Greatest Traffic Concerns for Residents

Many of the residents surveyed listed truck traffic as a primary concern both because of air quality impacts and because of safety concerns for drivers, pedestrians, and residents. The routing of trucks through residential neighborhoods is of particular concern because of the noise created by trucks and because it puts residents in close proximity with the effects of

truck traffic.

Other vehicular traffic including passenger cars, buses, barges, and construction equipment are also a concern because of their contributions to air pollution, congestion, and traffic injuries. Limited access to public transportation and city planning that encourages car-dependency are two longer-term issues that should be addressed in order to reduce vehicular traffic through the community.

8. Recommendations to Address the Greatest Traffic Problems

The highest priorities for Chelsea Creek residents fall into two categories: efforts to mitigate the effects of truck traffic and longer-term traffic planning work.

Community Actions

- Work with the Cities of Chelsea and Boston to improve signage throughout the community. Truck exclusion routes should be checked to see if they are marked, and missing signs should be noted and reported.
- Distribute truck exclusion map to local trucking companies.
- Distribute anti-idling information to buses, trucks, and cars and work with local police to increase enforcement of anti-idling laws.
- Conduct vehicle counts at more intersections using standardized methodology.

Longer-Term Priorities

- Work with U.S. EPA, truck companies, and Massachusetts Port Authority to encourage the use of low-sulfur diesel in trucks and buses. Prioritize industries related to airport services and buses.
- Work with neighboring communities to conduct traffic and truck route planning. The impacts of increased parking capacity and new construction should be included.
- Work to improve public transportation to East Boston and Chelsea. Evaluate ridership and MBTA investment and the feasibility of light rail.
- Establish alternative transportation methods such as bike and walking lanes and carpooling.
- Review traffic accident data (police reports, 911 calls) to determine the percentage of traffic accidents that involve out-of-town drivers, and the percentage that involve drivers from Chelsea and East Boston.
- Urge the Cities of Chelsea and Boston to conduct a study to examine the impacts of airport and airport related traffic on the region.

Personal Choices

- Limit vehicle use by using public transportation or carpooling.
- Choose a high fuel efficiency car.

9. Contact List

The following is a list of government agencies and community organizations which are involved in transportation planning and traffic issues.

Boston Metropolitan Planning Organization ..... (617) 973-7100
www.ctps.org/bostonmpo

Central Transportation Planning Staff, Bill Kuttner .....(617) 973-7132
www.ctps.org

Massport Community Affairs Office, Dorothy Steele .....(617) 568-3705

References and Additional Publications:

Brugge, Doug, Zenobia Lai, Christina Hill, William Rand. *Traffic Injury Data, Policy and Public Health: Lessons from Boston Chinatown*. 2001 (Draft Publication).

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Peters, Annette, Douglas W. Dockery, James E. Muller, Murray A. Mittleman. Increased particulate air pollution and the triggering of myocardial infarction. Circulation. 103:2810. June 2001.

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